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PETROLOGICAL ABSTRACTS AND REVIEWS

CAMPBELL, ROBERT. "Rocks from Gough Island, South Atlantic,"
Trans. Roy. Soc. Edinburgh, Vol. L (1914), Part II. Pl. 1.

Describes various igneous rocks collected by the Scottish National Antarctic Expedition, 1902-4.

CLAPP, CHARLES H. "Geology of the Igneous Rocks of Essex County, Massachusetts," *U.S. Geol. Surv., Bull. 704* (Washington, 1921). Pp. 132, pls. 18, maps 2.

In this report is given a summary of previous work done in this interesting region of alkalic rocks, and considerable new or unpublished data are added. Two groups of rocks are recognized, an older sub-alkaline group consisting of granites, granodiorites, quartz-diorites, gabbro-diorites, and gabbros, and a younger alkaline group consisting of alkali-granites, alkali-syenites, and nephelite-syenites, with some diorite, diabase, and gabbro. There are many varieties of dike rocks, quartz-porphyrries, paisanites, sölvbergites, tinguaite, diabases, camptonites, vogesites, kersantites, minettes, fourchites, quartz-keratophyres, etc. The petrographic descriptions are fairly complete, many analyses are given, some of the modes are determined, and the structural relations are described. Of the essexite of Salem Neck, the author says (pp. 124-25): "It is not a differentiate of the alkaline or nephelite syenite but is a contact-metamorphosed gabbro or gabbro-diorite of the Salem type or in some places a metamorphosed olivine-bearing diabase. The schistose varieties and the more siliceous varieties of essexite, such as those containing micropertthite, considerable nephelite, and large fawn-colored augites, are true hybrid rocks."

COCKFIELD, W. E. "Sixtymile and Ladue Rivers Area, Yukon,"
Canadian Geol. Surv., 1921. Pp. 60, pls. 6.

This report, largely stratigraphic and economic, contains general descriptions of various schists, amphibolites, granite-gneisses, pegmatites, andesites, diabases, rhyolites and granite-porphyrries, and various ash beds and sediments.

COLLINS, W. H. "The Age of the Killarney Granite," *Canadian Geol. Surv., Museum Bull.* 22 (1916). Pp. 12, pl. 1, map 1.

The Huronian formations along the coast of Lake Huron have been greatly folded and faulted, and intruded by granite batholiths. Both disturbance and granite invasion were completed long before Ordovician time.

COLONY, R. J. "Petrographic Study of Portland Cement," *School of Mines Quart.*, Vol. XXXVI (1914), pp. 1-21. Figs. 14, bibliog. 14 items.

Gives petrographic criteria by which the fitness of cement and concrete may be judged.

DALY, REGINALD A. "Petrography of the Pacific Islands," *Bull. Geol. Soc. Amer.*, Vol. XXVII (1916), pp. 325-44. Bibliog. 58 items.

Concludes that underneath the Pacific Ocean the only primary magma is basalt, that pyroxene andesite and picrite are direct differentiates from it, and that the alkaline rocks may possibly be due to the solution of small proportions of limestone. There is a nine-page alphabetic list of the various islands with the different rock types occurring on each, and a list giving the number of islands from which the various rocks have been reported.

DALY, REGINALD A. "The Geology of Pigeon Point, Minnesota," *Amer. Jour. Sci.*, Vol. XLIII (1917), pp. 423-48. Figs. 5.

Believes that the "red rock" originated through both assimilation and differentiation rather than through the differentiation of a wholly primary magma, but says a final decision concerning its origin must for the present be delayed.

DALY, REGINALD A. "Metamorphism and Its Phases," *Bull. Geol. Soc. Amer.*, Vol. XXVIII (1917), pp. 375-418.

Proposes to classify metamorphic processes as follows:

A. Regional metamorphism.

1. Static metamorphism.

a) Stato-hydral or hydrometamorphism (low temperature).

b) Stato-thermal or load metamorphism (high temperature).

2. Dynamic metamorphism.
 - a) Dynamo-hydral or slaty (?) metamorphism (low temperature).
 - b) Dynamo-thermal or friction (?) metamorphism (high temperature)
 3. Dynamo-static metamorphism.
 - B. Local metamorphism.
 1. Contact metamorphism.
 2. Load-contact metamorphism.
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DRESSER, JOHN A. "Granitic Segregations in the Serpentine Series of Quebec," *Trans. Roy. Soc. Canada*, Vol. XIV (1921), pp. 7-13.

Granitic dikes are limited to the peridotite-serpentine area of this region, and are believed to be local fillings of contraction cracks in the cooling peridotite by part of the still liquid acidic magmatic residues. Larger irregular masses are believed to be residual segregations from the magma of the peridotite and to have been formed *in situ* by differentiation.

DU TOIT, ALEX. L. "The Karoo Dolerites of South Africa: a Study in Hypabyssal Injection," *Trans. Geol. Soc. South Africa*, Vol. XXIII (1920), pp. 1-42. Figs. 5.

The uneroded remnants of strata invaded by these South African "dolerites" (British usage) cover fully 220,000 square miles, and fully half as much more has been removed. The rocks are composed of labradorite and augite, with or without olivine, and are of ophitic texture. They are almost exclusively confined to beds of the Karoo system, and date from the Rhaetic or Lias, Middle Jurassic at latest. The intrusions form intersecting dikes and a series of sheets, one above the other. The latter are practically horizontal and vary in thickness from 100 to 3000 feet, although in some cases still thicker sheets are found. Thus the curved sheets of the Queenstown district attain a thickness of fully 1,500 feet and cover some 40 square miles, and the Ingeli mass is over 3,000 feet in thickness. Metamorphic action is practically confined to baking of the sandstones and shales into quartzite and hornstone. With the exception of a few isolated and small-scale cases, no signs of assimilation of the strata by the invading magma were found. The sheets, with the exception of decrease in size of grain at the margins, are generally uniform in texture. In a few localities, enstatite partially or

wholly replaces augite, and the rock has a gabbroidal texture; in others there are more acid phases, and the rock passes through quartz-dolerites and diorites to granophyres and granites. All such departures are thought to be due to post-injection into the cooling body, or pre-injection into the intercrustal reservoir. The intrusive sills belong to one period of injection, and all phases were completed within a relatively short time. Disbelieving that the intrusion could have taken place at one time, owing to the fact that the slabs of sediment maintained their orientation, Du Toit thinks that they were injected progressively from the summit downward to the base, a mode of injection which he describes as decensional *lit-par-lit* stopping.

EGGLESTON, J. W. "Eruptive Rocks at Cuttingsville, Vermont," *Amer. Jour. Sci.*, Vol. XLV (1918), pp. 377-410. Figs. 5.

The eruptive body at Cuttingsville, Vermont, is thought to be a composite stock, all of the rocks presumably coming from a single magma. Essexite was the earliest intrusion, and nordmarkite the last. Hornblende-biotite-syenite, pulaskite, foyaite, and sodalite-nephelite-syenite probably came between these two in about the order given. The order of intrusion of the dikes is likewise from basic to acid. Essexite-porphyrries were earliest, some of them perhaps apophyses from the essexite body. Aplite came after nordmarkite, and between these there were syenite-porphyrries and pulaskite-porphyrries. There are also dikes of tinguaitite and of camptonite. The descriptions are not always clear. Thus under essexite it is said that the plagioclase ranges from Ab_7An_3 to Ab_3An_7 , but it is not stated whether this is zonal, whether two different plagioclases occur in the same section (!), or whether the plagioclase differs in different parts of the area. A system of classification unknown to the reviewer is used, for the statement is made that "the abundant plagioclase allies it [the so-called syenite] to monzonite, but the ratio of dark silicates to feldspar warrants the designation of the rock as a hornblende-biotite-syenite." When it is stated that the "pyroxene is next to the feldspars in abundance," one imagines that it must be present in approximately the same quantity, yet the amount of feldspar is given as 90 per cent, sodalite as 3 per cent, and nephelite 3 per cent, leaving 4 per cent to be divided among pyroxene, biotite, apatite, magnetite, titanite, and possibly pyrite. The norm shows 2.35 per cent of corundum, but no feldspathoid. With five good rock analyses and an analysis of the hornblende, more carefully modal percentages would have been very instructive.

- EITEL, W. "Über das Vorkommen von Zinkblende im Basalt des Bühls bei Cassel," *Centralbl. f. Min., etc.*, 1920, pp. 273-85. Figs. 6.

Describes the occurrence of zinc blende in basalt. At an unknown depth, the erupting basalt broke through dikes of blende with a little pyrite and much quartz. Included fragments of the dike rock were assimilated and recrystallized.

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- EITEL, W. "Bemerkungen zu einer Untersuchung von Lewkonja über die von Hornstein im Basalt des Bühls bei Kassel gefundenen Eisenknollen," *Senckenbergiana*, Vol. II (1920), pp. 130-33. Figs. 2.

Native iron, from the basalt of the Bühl, near Cassel, is described.

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- EITEL, W. "Bemerkungen zu chemischen Untersuchungen des Herrn F. Flade über das Eisenvorkommen im Bühl bei Cassel," *Senckenbergiana*, Vol. II (1920), pp. 158-63.

Gives an early (1909?) chemical analysis of the Bühl native iron.

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- EITEL, W. "Studien über die Genesis der Einschlüsse des Bühlbasaltes," *Abhandl. d. Senckenbergischen Naturforsch. Gesellsch.*, Vol. XXXVII (1920), pp. 139-76. Figs. 29.

Among the separate studies in this paper are the following: On pseudomorphs of pyrrhotite after pyrite in the Bühl basalt; on the origin of the magnetite inclusions in the Bühl basalt; a comparative study of the native iron from Ovifak and Bühl; on the genetic relationship of the native iron to the inclusions of pyrrhotite and magnetite; the relationship between the strata penetrated by the Bühl basalt and the inclusions in the latter; experimental studies on the formation of pyrrhotite from pyrite at high temperatures; on the occurrence of a sillimanite-graphite rock with pseudomorphs of spinel, rutile, and enstatite after garnet as an inclusion in the Bühl basalt; and the gas reactions in the Bühl basalt and their rôle in the origin of the native iron.

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- ESKOLA, PENTTI. "The Mineral Facies of Rocks," *Norsk, geol. tidsskrift*, Vol. VI (1920), pp. 143-94.

Metamorphic rocks, by recrystallization, may arrive at a state of chemical equilibrium. The term "metamorphic facies" is here used to designate a group of rocks characterized by a definite set of minerals

which were at perfect equilibrium with each other under the conditions of their formation. Igneous rocks, likewise, may reach a state of equilibrium, and igneous and metamorphic facies may be spoken of together as mineral facies. Mineral facies, therefore, comprise all rocks which have originated under conditions of temperature and pressure so similar that from a definite chemical composition there results the same set of minerals, regardless whether formed by primary crystallization or by metamorphism.

ESKOLA, PENTTI. "On the Igneous Rocks of Sviatoy Noss in Transbaikalia," *Översikt av Finska Vetensk.-Soc. Förhand.*, Vol. LXIII (1920-21), pp. 1-99. Figs. 9.

This is an abstract from the reports of the Moscovian expedition to Transbaikalia in search of radium in 1914. Two great complexes of rock were found, a granite-granodiorite mass and the injected crystalline schists. The first mass is here and there intersected by lamprophyric, aplitic, and pegmatitic dikes, and there are larger aplitic masses. As the boundary between the granite and the migmatite is approached, the aplitic portions increase, until near the border there is an almost uninterrupted zone of light gray, aplitic granite. Still farther west the inclusions of crystalline schist become more numerous and the rock grades into migmatite with only occasional veins of granite. Before the intrusion of the granite, the crystalline schists were invaded by diorites and gabbros which are now metamorphosed and foliated, and cut by the later aplites and pegmatites.

The main igneous complex is called granodiorite, following Iddings, although the alkali feldspar and lime soda feldspar are in nearly equal amounts and therefore, as Eskola clearly recognizes, more rationally quartz-monzonite. The complete mode is not given. The aplitic border has a calculated mode which probably closely approximates the true composition. According to the reviewer's classification it is 227' (new form), consequently a granodiorite-aplite, the plagioclase being almost twice as abundant as the microcline. Two types of "sviatonosite" are described, one aplitic, but otherwise the two are of practically the same composition. They contain 25-31 per cent potash feldspar, 45-48 per cent oligoclase to andesine, 9-10 per cent andradite, and 8-17 per cent aegirite-augite and accessories. The author says they are andradite-syenites, but from the proportions of potash feldspar and plagioclase the reviewer would call them andradite-syenodiorites, or, if monzonites are considered in the classification, andradite-monzonites. They fall just over the line in Family 11'' (2211''), very near 11'.